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ON THE MIGRATION OF BIRDS.*

By Otto Herman, late M.P., Director of the Hungarian Central Office of Ornithology, &c.

At the moment of commencing my short lecture, I am under the impression of the surroundings, and of the occasion on which I have the privilege of speaking. Surroundings and occasion impose upon me duties I cannot afford to lose sight of. To speak on the migration of birds is an easy and, at the same time, a difficult task. Easy, if the phenomenon of migration is looked upon from the point of view of the impression it makes upon the mind of man; difficult, if we would do justice to the requirements of the subject as a scientific study.

It would be easy for me to draw a richly-coloured picture of the arrival of our pets in spring; to describe the feelings of the inhabitant of the temperate zone called forth by the sight of the first Swallow. The popular songs of all the nations of this zone teem with joy at the return of the songsters to wood and field; the poets, too—the noblest—are inspired thereby. Perhaps I might succeed in interlarding my description with oriental shades which might make a lasting impression on the practical sons of Albion, who take a lively interest in the enumeration of these facts.

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The reverse of the vernal picture, and the feelings awakened by it, is found in the autumnal migration. The disappearance of our faithful house and garden friends, the sudden silence of wood and meadow, makes us sad, because it tells of evanescence, and heralds inclement weather, thus rendering our depression doubly acute. The autumnal migration leaves its impression on the mind of the people too, an impression sometimes so powerful that a great nation cannot shake off the shackles of regret. I need only refer to the German song of the Swallow, written by Herlossohn, and set to music by the classical composer Abt, familiar alike to cottage and palace, as a testimony of this general harmony of feeling. I might perhaps add some fresh tints, but my sense of duty forbids me to do so. The fact that I have to speak in the heart of England, on the occasion of a strictly scientific congress, is decisive.

The direction the thought of England requires me to take on this subject is an easy question to decide. England has given the world three stars of the highest order. The first was Bacon of Verulam, who advises us, in considering the phenomena of Nature, to adopt the method of experience, a course which amounts to the exclusion of speculation, and especially of fancy. The second was Isaac Newton, who by the law of gravitation has taught us the all-conquering power of the laws of nature, and has explained the equilibrium of the universe, thus putting exact science in the foreground. The third was Charles Darwin, who has conquered the rigidity of the conception of organisms, and has explained the idea of evolution. The example of these three great men must cause me, especially on English soil, to confine myself to facts, to the exclusion of sophistry, fancy, and belief in authority.

Before, however, I undertake the development of this theme, I must make the following remark. In spite of all Bacon, Newton, and Darwin did, in spite of the victorious advance of the exact and inductive branches of science, speculative theories held the day, even during the nineteenth century, in the consideration of the migration of birds, taken as a science. This is found even to-day in the nature of the phenomenon itself. The power of flight of birds, of nocturnal migration, and many other unknown circumstances led people to talk of "riddles," even of

"miracles." They did not and still refuse to admit that it is our knowledge which is at fault, a position not conducive to experiment, leading to the declaration of judgments which are void of positive foundation, and of any actual inductive basis.

One of the most wonderful pictures of human intellect is displayed to our eyes when we learn that the great German Emperor Frederick II. (1194-1250), as "auceps," *i.e.* fowler and falconer, was induced to have recourse to the method of experience, and to follow Bacon's precepts long before Bacon lived, and that his views on the migration of birds were far better and more valid than those of many a famous author of the nineteenth century. The emperor knew that the birds pass from colder regions to warmer ones, and *vice versâ*; that not all birds are birds of passage; that some of them pass only from the mountains to the valleys, and *vice versâ*; that the movement is dependent upon temperature and food supply; that they meet before commencing migration; that land-birds move in a certain order, in two convergent lines—*e.g.* Cranes—even that the bird at the head of the flight has to accomplish the hardest work, and is therefore relieved;—all absolutely correct opinions. It is a thousand pities that the concluding part of the manuscript is lost, and that we are therefore not in a position to know where, in the opinion of the Emperor Frederick, the birds actually do pass; but the words "warmer regions" are sufficient to prove that the emperor had no "riddles," but only *natural* things in mind.

But as in other fields, this period is followed by a time of decadence, a natural consequence of departing from immediate experience: the characteristic of this age of decadence is speculation, which sought contributions from old authorities, and the axioms established by them.

Then arose the so-called immersion theory, with all its appurtenances; the belief that the birds of passage do not leave us at all, but spend the winter sleeping either at the bottom of some water or in caverns or hollow trees. Even serious natural scientists of the eighteenth century, as Geoffroy de St. Hilaire (1772), still believed in winter sleep, and, indeed, pretends to have seen with his own eyes sleeping Swallows, certainly Bats. Your great countryman, E. Jenner, the benefactor of

mankind, had to protest against this, as he did in 1824; yet the misbelief has nevertheless prevailed in more or less obscure writings until the present day.

Even in the high-class works of famous authors of our own time echoes of this mediæval belief in miracles are still discernible: mention is made of the gift of presentiment, of miraculousness, of puzzles which, if reduced to Bacon's terminology, are nothing but "want of inductive knowledge, and of positive notion resulting therefrom."

It would require the foresight and patience of a Theseus to unravel the labyrinth of peasants' maxims dealing with the world of birds and the foretelling of the weather.

Taken as a whole, the science did not get much farther than an amassing of arrival- and departure-data, which finally formed a chaos that daunted and still daunts the boldest authors. Most of them preferred to take the thing at the easy end: to draw far-going conclusions from a few data, to exert their ingenuity, sometimes only their fancy. This state of things naturally resulted in many singular contradictions, of which I would like, with your kind permission, to mention a few:—

Naumann.—There are definite routes of migration.
Homeyer.—There are no routes of migration.

Weismann.—The birds learn how to migrate.
Gaetke.—The birds act by instinct.

Palmén.—Orientation is a traditional gift.
Weismann.—Orientation is congenital.

Gaetke.—There is no leadership.
Weismann.—There is leadership.

Wallace.—The weather has no essential influence.
Homeyer.—The weather has an essential influence.

Naumann.—Temperature plays a very important part.
Angot.—Temperature is not an incentive.

Lucanus.—The flight takes place at a height of 3000 ft.
Gaetke.—The flight goes on at a height sometimes of 35,000 ft.

Braun.—The original home of the birds is the tropics.
Deichler.—The original home is not the tropics, &c.

The prevalence of the speculative tendency in endeavouring to explain the movement led many authors to assume migration routes, and to schematize them, even before they were corroborated, on maps. If we draw the most important of these migration routes on a map of the eastern section of the northern hemisphere, an entanglement of lines is obtained; if all the routes indicated by the authors are entered, we get a Gordian knot. We are overcome by the feeling that it is impossible for the birds to pass along these routes. Some orni-chartographers, instead of migration routes, draw, so to say, only stupendously bold lines over points where no human being has ever set his foot, still less birds under observation!

I do not want to enter here into a critical discussion of the subject. I take the facts—*they exist*, and authorize us to continue our investigations on the basis of facts, therefore in an inductive way; and, in order to do this, we must proceed in a strictly methodical manner.

I shall now, in brief outlines, elucidate the principles of the method. The migration of birds is a phenomenon of movement which leads from one zone to the other, and *vice versâ*. It follows therefrom that *space* and *time* are the basis of the phenomenon, and that the question cannot be solved from the phenomena of *one* locality or point only, even if this be a whole country. The solution is possible only if we elucidate the phenomenon in its *whole* course, or, to express it concisely, if we endeavour to grasp and clear it up.

From the nature of the subject it follows that the task can only be accomplished by *a division of labour*, which ought to be evenly divided as far as possible over the whole area. The migration of birds corresponds in the main with the seasons of the year, and is thus, as a phenomenon, connected with the subject we call meteorology. Meteorology owes its great success to the network-like division of its areas, to the uniformity of observation, and of working out of the data. The migration of birds, as "ornitho-phaenology," ought to be treated exactly in the same way, *viz.* in organical connection with meteorology.

The short space of time at my disposal prevents me from entering on a detailed exposition of the method. I shall therefore only touch on the essential points. We must work out the

myriad data recorded in literature methodically according to space and time, and draw from the average figures thus obtained the conclusions relating to the progress of migration; so much for the past. The new observations must be carried out at all points uniformly, and continued, year after year, according to the same even method.

But, you will ask me whether I am able to point to the tangibility of the method? I answer, in the case of our Hungarian method, certainly, and I shall restrict myself to the Swallow; the question is now, what do we know of the spring migration of the Chimney-Swallow in Hungary?

In 1898 more than five thousand nine hundred masters of elementary schools, and others also, decided to observe the arrival of the Chimney-Swallow, and to report the results of their observations to the H. C. O. These observers, more than six thousand in number, covered the area of Hungary very well. They sent in their data on special post-cards; the points of observation were geographically determined, and then each day separately schematized on particular maps. In such a way we obtained fifty-four day-maps, each with as many dots as there were points of observation. The result was:—Beginning of the migration, March 10th, 3 points; culmination, March 30th, 343 points; end, May 2nd, 15 points. Hereby the series increases until March 30th, when it culminates, and then it decreases. We see furthermore that the arrivals fluctuated according to the state of the weather; that the settling of the alpine region began only at the end of April; that the plain, the hilly portion (Transdanubian district), and the Transylvanian plateau differ with respect to the time of migration; and that therefore Hungary may be divided into *four* migration areas. Furthermore, it was remarked that the settling did not take place on narrow routes of migration, also not in a broad front, but that it resembled the *scattering* of the seed by the sower, where many a seed might be flung this side of or beyond the place for which it was intended. It was, moreover, proved that the mean day of arrival in Hungary for the year 1898 was April 8th, since rectified, on the basis of more than ten thousand data, to April 7th. From these series followed the settling maps, which show that the Swallow settles in Hungary in

spring, coming from S.; the White Stork from S.E. to N.W.; the Wagtail from W. to E.; the Woodcock from S.W. to N.E.; the Cuckoo from S.E. to N.W., &c. All positive facts which it would not have been possible to establish by the old method.

And, if you ask me what else we have determined by our method, I reply: We know that the Swallow settles in the areas of Europe, from Gibraltar to Luleå, in one hundred and five days; that the young Swallows are already fledged in Gibraltar when the old ones for Luleå only arrive; that the settling of Hungary may last as long as seventy days; that the Swallow remains here on an average one hundred and sixty-seven days. This must be sufficient. If I were to enumerate all the facts brought to light by the inductive method, I should be obliged to put your patience to a severe test, but the result would only be to show that Hungary is the best observed and best worked-out country. The whole work is still only a local one, even if taken in the widest sense of the word. We Hungarians only work now with three hundred thousand critically determined data. This is much, and still little, if we take the areas still absolutely unknown, or of which we barely possess any data.

For the working out of the migration of the Cuckoo we have hitherto collected from the whole area of distribution thirty thousand positive data, but we are still without those of the Iberian peninsula, the entire Balkan, and the larger part of Italy. From England, on the contrary, we possess the most marvellous series concerning the appearance of this bird. It was placed at our disposal by Mr. Thomas Southwell, of Norwich, and comes from the Marsham family in Stratton Strawless, who have kept a faithful record of the arrival of the Cuckoo, with a few intermissions, from 1739 to 1904—a fact which does unspeakable credit to the many generations who have continued the work. When, however, all regions are as well explored and as well known as possible—at least, as well as Hungary is—and not till then will the true nature of the phenomenon of migration be revealed to us. But, people will say, it is an enormous, a Herculean, task to make millions of observations, and to work them out methodically. That is true enough. But I ask, which of the tasks the human intellect has accomplished in the interests of its own enlightenment has been easy? Not one! The road

to success is a true Calvary. It is our evident duty to carry out the work of "ornitho-phaenological" observation. In this task I count, in the first place, on the ornithologists of England, the heirs of Derham, a man who, as far back as two centuries ago, busied himself with the science of observation. What is required of us is to throw into the balance a sense of duty, courage, and unbending resolution.

Before closing, however, I must take into account the realistic tendency of the time. We often hear the question asked, what can a knowledge of the migration of birds profit us? The profit is a twofold one:

1. The solution of the problem is in the interest of science, therefore of intellectual progress; consequently the highest profit of mankind.

2. Only the solution of the problem can give us a correct notion of the great part that birds of migration play in the household of nature.

The millions of birds which, season after season, wander from one zone to the other represent an enormous aggregate of labour; and this not only by their flight itself, but by their search for food. This labour and the search for food act in the organic life of nature as does the regulator of a steam-engine, at one time accelerating, at another retarding. By migration this labour is transferred from one zone to the other; it is indispensable, and can only be performed by the birds, whose bodily structure corresponds in many respects to peculiar tools.

A full insight into the essence of the work done by birds will give us a correct notion of their usefulness or injuriousness to man, and lead us to rational action for their protection. A clear conception of the masses of birds in question may be gathered from an inspection of the hecatombs of winged creatures which year by year during migration shatter their heads in contact with lighthouses.

I thank you, gentlemen, for the patience and indulgence with which you have listened to my remarks.

MENAGERIE MEDICINES.

By W. B. Robertson.

In olden times, before scientific deduction and a knowledge of chemistry had taken the guiding-reins in the practice of medicine, the cures practised, even by command of the then highest medical authorities, were, if viewed through the eyes of our latter-day knowledge, marvellous to the verge of unbelief. The art of printing has preserved to us records of the remedial agents of two and three centuries ago, and a cursory study of these records yields many interesting instances of the crudity of the medical science then in vogue.

Wild animals were cut apart, and each separate organ was supposed to have a potency, usually bearing some relation to the nature of the animal in life. In this respect the medical beliefs of former centuries had a striking resemblance to the superstitions which hold sway among some native tribes where various wild animals have their homes to-day.

The Lion took his place at the head of the list of animals whose parts were held to be efficacious in the conquering of diseases. His heart, dried and reduced to powder, was looked upon as a specific for epilepsy; his fat was good for all affections of the nerves and for deafness; his flesh lent increased strength to the brain; his blood, treated in the same manner as his heart, was an antidote for poisoning, and even his bones in dry powder were used to allay fevers. The Elephant seems to have been required for his tusks only. Grated ivory was administered to fortify the heart, to resist poison, and was also made into a decoction with the same intent.

The equipment of the Hippopotamus most valued was his teeth. Powder of Hippo teeth was sometimes given to arrest internal bleeding. The Camel was almost as useful as the Lion in regard to the different parts of his anatomy which he was compelled to yield to the service of medicine. It is stated that

nearly all his organs contained "valuable oils and volatile salts." His gall mixed with honey was a confection given to invalids of the middle ages, and his blood, fat, flesh, and brain had each its niche as a curative. Of the Giraffe, the only parts which old-time apothecaries seem to have commandeered were his horns and nails for epilepsy. For the same disease the Wolf was called upon to yield his heart, for pulmonary disorders his lungs, his intestines for stomach troubles, and his teeth to assist the teething of children.

In the list of smaller game, the Hare had first place. The hair of this animal was applied to wounds to arrest bleeding, and the blood, heart, and lungs were given for dysentery. The blood of a newly-killed Hare had merit in skin diseases.

But no living creature large or small was favoured as was the Viper. Belief in the potency of all parts of the Viper was strong and universal throughout Europe for many centuries. Much literature describing its use in medicine is open to the student. The instructions given by one old authority regarding the procuring of Vipers are these:—"One should seek Vipers in spring or autumn, because then they are fatter and stronger than they are at other times. The volatile salts of Vipers are preferable to those of all other animals, because they are more subtile."

Vipers were given in many forms, including essence, tincture, oil, salts, and powder. The powder—that is, the flesh dried and triturated—was considered by some old writers as much inferior to the other preparations, in the belief that the drying dispelled much of the strength. Some practitioners went so far as to insist that the deaths of the animals caused a similar deterioration, and insisted that they should be put into the retort or the decoction-pot while still alive. A bread of Vipers was even made. Powder of Vipers' flesh was introduced into cakes with sarsaparilla, yolk of egg, yeast, flour, and milk; and one may read that this, eaten regularly, cured leprosy. Vipers generally were held to be victorious over nearly every disease of which therapeutics had cognizance, and to yield concentrations little less potent for good than the elusive elixir of life of ancient alchemy.

Serpents of all sorts took a place below Vipers, yet were held in high regard. The skin which the Serpent discards each

summer was made into an infusion, and was given for disorders of the ears, teeth, and eyes.

The discovery of the New World opened in its flora and fauna too valuable a field to be neglected in the search for new remedies, and the animals which soon became accepted in medicine were the Beaver, the Buffalo, and the Armadillo. "Castorem" was an extensively used drug two centuries ago. It was made from the Beaver, and given for nervous disorders, and even for measles and small-pox. Buffalo horn was an esteemed sudorific. The bone in the tail of the Armadillo was broken into very small pieces, which were put into the ears to cure humming in these organs and deafness. We find a warning not to use more than one piece at a time.

The roasted heart of a Monkey was believed to sharpen the memory. Stones said to exist in the head or stomach of a Porcupine were believed to chase away "bad humours" by causing perspiration. The claws of the Lynx, worn as an amulet, were good for the nerves. The flesh of the Chameleon was held remedial in cases of gout and rheumatism, and the dried blood of the Tortoise was given for epilepsy. The list might be extended down the whole catalogue of animal life as it was known at the time of which we write.

If the domestic animals were not held in higher esteem than those which required to be hunted, the methods of preparing them or employing them in medicine were often more repulsive. For instance, we read that for pains in the side a living Cat opened and applied thereto performed a cure. Not quite so disastrous for the Cat, but perhaps more dangerous for the patient, was a remedy recommended for whitlow, a trifling but painful growth under the finger-nail. One was advised to put the finger into the ear of a living Cat several times a day for fifteen minutes each time. The Dog was often treated as unceremoniously as the Cat. For certain brain diseases a newly-born Dog was cut open and applied to the head as a cap. The fat of a Dog was considered to make a good ointment, and was frequently used as a base. It was applied for deafness, and given internally for consumption. The inwards of the Horse appear to have been neglected by ancient medical practices, but the excrescences which appear upon the legs of Horses were, if

cut in spring-time and grated to powder, taken for epilepsy. Attempts were made to cure the same malady by internal doses of the horn and hoof of the Ox, the parts of which were believed to possess virtue as curatives. The bones, particularly the bones of the legs, were introduced into plasters. The stomach of the Ox sometimes contains a ball formed by the accumulation of hairs which have been swallowed through a course of years, and this was both used as we use a sponge and was given as an internal medicine to arrest bleeding. The service rendered in medicine by the Cow was similar to that exacted from the Ox, and in addition the udders were considered a good pectoral remedy when made into broth. The Pig and the Ass also contributed to the curious remedies of our forefathers, but sufficient has been written to show how absurdity reigned, and to secure appreciation of the progress made since the days when medicine scarcely deserved to rank among the sciences.

THE FAUNA OF THE "CEDARS," LEE, KENT.

By Joseph F. Green.

In an Ordnance map dated 1800 this place is shown as so many fields, partitioned out by small elms, and, although these elms are now gigantic, the old arrangement is still visible. The cedar trees are *far, far* older, being probably contemporary with their neighbours, the famous Spanish chestnuts of Greenwich Park, planted by the children of James the First. For some thirty years I have resided more or less continuously in these grounds, a suburban oasis of some forty acres, belonging to Mrs. Penn; so artificially laid out, that several generations have learnt to excel at our national games, and yet sufficiently wild and wooded to attract and protect a fair representation of the animal life that haunts our great metropolis; so close to London, that on an extra still night you may catch a weird echo of sonorous Big Ben, and yet so far afield that you may perhaps at the same time be charmed by the loud clear notes of a Nightingale, or be startled by the harsh scream of an Owl. Here, as elsewhere, it has ever been my delight to make notes on all matters appertaining to natural history, which enables me now to give a short account of my personal experience of the "Cedars" fauna.

Our wild mammals are few, although we have our share of Rabbits, Rats, Voles, Field-Mice, and Mice (domestic). Hedgehogs, owing to their nocturnal and retiring habits, are not often visible, but our night watchman occasionally sees them, and I remember a couple that were hybernating in a sort of nest just under the ground. The Dogs had scratched them up, but we called them off, re-covered the little prickly animals, and all was well.

In 1903 I contributed a paper to the West Kent Natural History Society on the birds of the "Cedars," and have only one addition to make—a Wheatear, that strutted about on our West Lodge lawns, May 2nd, 1904, and then *flew up into*

a tree; unusual for a bird so associated with barren heaths and Rabbit-warrens. The number of wild species I have myself identified in the grounds is seventy-two, but several of these are solitary instances, such as Pied Flycatcher, Peregrine Falcon, Turtle-Dove, Woodcock, Cormorant, Ring-Ouzel, Wheatear, and Red-backed Shrike. The *rookery* here is a very ancient affair. The Rooks commence to repair their nests in February, which through the winter months have been used by Tits and other small birds to roost in. I could relate plenty of stories about their peculiarities, but will confine myself to two. In February, 1901, we started hockey for the first time on the cricket-ground. The large elms overshadowing the ground contained the usual Rooks' nests; but the busy occupants failed to appreciate this innovation, and moved all their nests bodily across the railway to the other side of the grounds. The Rooks (with other birds) are fed every morning on the "Cedars" lawn. One Sunday this was forgotten, and I saw a small detachment of the boldest spirits march up to the drawing-room window and commence tapping. A sort of gentle reminder! With them I often see, and still oftener hear, a pair of Carrion-Crows.

A Ring-Ouzel was picked up by my youngest daughter in the camellia-house, half-choked by a berry. This was extracted, and the bird lived some time in a Pheasant aviary, but finally died in a fit. It was no doubt attracted by the "Cedars" grounds on its autumn migration. A Hawfinch I picked up dead on a West Lodge* path; these birds visit us every March, and feed on the holly-berries, but I have never noticed their nest. There is occasionally a stray Pheasant or two on the grounds, and last year a Partridge hatched off her clutch and reared the brood, notwithstanding the assiduous attentions of a Kestrel-Hawk, that fortunately gave itself away by screaming.

The Owls are a great institution here, and I love to hear them. In June and July the young Brown Owls seem to call for food all night—a quick "too-whit." The old birds give a very loud drawn-out whistle, on a descending scale, followed by the same note in tremolo, like a child in distress; our watchman sometimes sees them dive into the ivy after the roosting Sparrows, which swarm here. I have often counted over one hundred and fifty on a fence by the West Lodge field. The Barn-Owls love

* A house built inside the grounds.

to sit at night, in a friendly way, by the West Lodge Pigeons, looking, no doubt, for Mice.

Sparrows, Starlings, and Wood-Pigeons are increasing here (and I think everywhere else) enormously. The Wild Geese (*A. albifrons*), which are not pinioned, nest at the pond regularly; they eat nothing but weeds and grass; they are sometimes accompanied by a Heron. I hang pierced cocoa-nuts out for the Tits; and the Great Tit, Blue Tit, and Coal-Tit seem to prefer this to any other food. The Great Tit, I am glad to say, can hold its own against any number of Sparrows. Nightingales seems to have left us, but, as they have returned to "Brooklands," close by, they may perhaps favour us again. The Cuckoo still remains faithful, though every spring we hear less of its welcome note, owing, no doubt, to so many properties around being amassed for building purposes. For years I have been trying to get a clutch of Hedge-Sparrow's containing a blue Cuckoo's egg; and last year I succeeded. It is curious why a Cuckoo's egg in Redstart's is nearly always blue, and yet hardly ever blue in the Hedge-Sparrow's, although Redstarts' and Hedge Sparrows' eggs are almost identical.

It is much more difficult to give an even fairly accurate list of Lepidoptera, especially the night-flying and sober-coloured moths. Still, by regular sugaring, using a moth-trap, and taking advantage of nature's sweets, I have been able to catalogue the imagines of fourteen butterflies and ninety-three moths. The butterflies are all of the commonest (but I live in hopes of one day seeing *antiopa* on the over-night's sugar, as I did at Bifrons last autumn). Our earliest, not counting hybernating species, is the pretty little "azure blue" that appears in some numbers every April (attracted, no doubt, by the fine old West Lodge hollies). Of moths, the handsome *Plusia moneta* (it is still without an English name), that suddenly invaded our shores, is very common, and very conspicuous as a larva on our larkspurs, and is very easily reared. The hawk-moths (lime and poplar) are numerous as larva, pupa, and imago. A light variety of *populi* is common and very handsome, and the little Humming-bird Moth occasionally visits our pink geraniums. The *Noctuæ*, of course, are more easily attainable, owing to sugar; and I find methylated spirit the best draw. It is a pretty sight to watch

by lantern light the great Red-underwings thrusting their long probosces into the sugar, with their sparkling eyes and quivering scarlet under wings. But still more enthralling is it to find, as I did at Benacre, on the 24th of August, 1901, a "Clifden nonpareil" amongst them.

On the 31st of July, 1888, the day after the great storm, one end of the "Cedars" pond resembled a small waterfall. Numbers of Eels were washed ashore, and amongst them one four feet long, eleven inches round, and seven pounds in weight. A still more extraordinary take, in the same water, was a Rudd that weighed four pounds four ounces. I caught it myself in July, 1874, with paste soaked in honey, during a sharp thunder-

RINGED SNAKE (*Tropidonotus natrix*).

storm; and also at the same time two Carp, five pounds each. This pond contains Carp, Bream, Perch, Roach, Rudd, Dace, and Eels. I remember once catching in this pond a two-pound Perch, which I had stuffed, but now cannot find. The history of this piece of water is obscure, and its volume inconstant. A few years ago it rapidly diminished, without our discovering the reason; so much so, that we offered the great Carp to the "Zoo." Luckily they declined them, for the water all came back, and is now higher than ever. Kingfishers and Moorhens have nested on the banks as long as I can remember, and Wild Duck, Herons, and Sandpipers pay occasional visits. An uncle

of mine was exceedingly fond of fishing in this pond, and was there nearly every day. Once, while fishing from the bridge, he struck, as he thought, a fine Carp, which, on reeling in, was found to be a Tortoise. It had to be landed somehow to get the hook out, and to do this it had to be hauled up to the bridge. My uncle was a sensitively humane man, and when it was up his troubles were far from over, as it kept drawing in its head, hook, line, and all. He finally returned the creature to the water, put up his things, and never fished there again.

A few days ago one of the gardeners killed a Ringed Snake, two feet six inches long. As these Snakes live mainly on Frogs, it had probably only recently left the water; so I suppose it is right to class it as another denizen of the "Cedars" ponds. This is the first true Snake I have seen here, but I have several times noticed a Slowworm basking in the sun.

AMONG NORFOLK TERNS.

By A. H. Patterson.

On Whit-Monday, June 12th, of the present year, I paid a flying visit to the quaint old town of Wells, and, in company with Dr. S. H. Long, of Norwich, spent a couple of hours exploring the marshes reaching immediately from the town-front to the seashore. The tide was out, leaving exposed, in the bed of the creek that passes for a river, patches of Mussel-covered mud; these molluscs had been spread there to fatten—or sicken—in what must be, even on the flood-tide, sewage-tainted water, a subject for the local authorities. I should personally much prefer the clean-fed "Stukeys" from Stiffkey, a few miles eastward out there on the seashore. A single Common Tern was hungrily eyeing the rather turbid bit of water a few yards above the surface, making more pretence at than really fishing.

The tramp and scramble and leaping across the rough marshland, intersected by numerous sharply-cut creeks that wound round about in every direction, and traversed by well-worn trails leading seawards, was made interesting by reason of meeting with unfamiliar forms of plant-life, which, with the exception of the Michaelmas-daisy (*Aster tripolium*), the jointed glasswort, and the aromatic sea-southernwood, were altogether different from those of my own neighbourhood. The thrift was conspicuously sprinkled around, with tufts and clumps of the shrub-like *Suæda fruticosa* in equal abundance. The creeks and "pulk-holes" gave evidence of a varied fauna and invite research.

A pair of Redshanks had much to say against our intrusion; they evidently had a nest somewhere in one of the higher tussocky corners, which would be awkwardly placed, however tempting the area generally, unless beyond the reach of the tidal water, which on the spring tides, I am assured, places the whole marsh under water. I thought it rather odd that there should be

here a three hours' flood and a nine hours' ebb, and, stranger still, that a twelve- and fourteen-foot rise is a usual thing, seeing that at Yarmouth, not so far away, a six-foot tide is esteemed a good one! A couple of Sheld-Ducks most picturesquely broke the middle distance with a dash of conspicuous colouring, but they were exceedingly shy, and quickly took to wing.

The locality chosen by the Terns for their nesting quarters is barely above the common level, and the sea-water, lifting above the creeks, must on unusually high tides trickle into the depressions here and there. These cover an acre or two—perhaps more, and are within a stone's throw of the sea, from which they are separated by a ridge of low hummocky sand-dunes hardly deserving the name of sand-hills. These shut off the highest wave-sweeps of the far-travelling sea that at low water is a good mile away. The usual high-water limit, distinguished by a long thick rim of Cockle-shells, numbered by myriads, and empty valves of *Solen ensis*, and which I had but a few moments for inspecting, gave promise of many an hour's remunerative overhauling to anyone sufficiently interested. And, *mirabile visu!* nest after nest of Common Terns dotted the inside edge of this ridge of jetsam and flotsam a span or two only from the tide-limit; the spume of the waves must have blown at times upon them. On asking the keeper what about a higher tide than usual, Tom Cringle only suggestively shook his head. On referring to the all too meagre report for 1904 of the Wells Wild Bird Protection Society, I find a suggestion of danger: "There were neither heavy gales nor high tides to harm the nests, and by poisoning the Rats early in the season the young birds were saved from their depredations."

The larger area referred to is a wide-spreading shingly level, interspersed by patches of sparse verdant dune-herbage. The Terns—the Common (*Sterna fluviatilis*) and the Little (*S. minuta*)—had much to say by way of protest, and flew screaming around—the Little "Chit-pearl" as vociferous as its larger relative—in excited hundreds, like so many whirling snow-flakes, keeping up their objection so long as we kept upon the move. The nests in many places were but a yard apart; a triangular stride would cover three of them. I was struck by the marvellous correspondence in colour of the eggs to their surroundings; those

deposited among the rufous-tinted shingle were of a russet-colour. The ground here was as smooth almost as if it had been rolled; indeed, the levelled stones gave one the impression of a rude attempt at tessellated pavement. Among the blue-grey patches of pebbles the predominating tints were greyish, and on the greener portions they most assimilatively assumed that coloration. In some instances, however, protective colouring was a negative quality, and conspicuously contrasted eggs quickly caught the eye. Dr. Long pointed out one egg, on a dark ground, of a vivid bluish green, and some nests contained three differently coloured eggs. Every egg was blotched more or less with bluish ash and dark brown.

The eggs of the Common Tern were easily distinguished from those of its *confrère* by their larger size. In almost every instance three eggs were laid, and most were hard-set; I obtained an addled one of each species, and understood that one clutch of young birds had already forsaken their nest. We looked in vain, however, for any of them in the adjacent marrams; they appear to be as capable of concealment as the little ones of the Ringed Plover. Extreme vigilance was necessary to avoid trampling on nests, but we soon learned to "spot" them, thanks to Tom Cringle's "trade mark" in the shape of a heel-pushed heap about a foot away from each one. With a few exceptions every nest of the Common Tern was lined with coarse, sixpenny-sized pieces of Cockle and Oyster shells, those of the Little Terns being adorned by a handful of finer fragments. There can be no doubt these pieces of shell are collected by the birds instinctively for the sake of their useful retention of heat; they certainly do not add to the comfort otherwise. All the eggs were not only warm to the touch, but the lining of shells was distinctly so also. Their Ring-Plover neighbours used still smaller fragments. A few of the larger Terns' nests were lined with dry grass-bents, and formed really comfortable cosy habitations.

Here and there we came across patches of pebbles running larger, many of the size of the Terns' eggs, others up to that of a hen's egg; these seemed to be seldom wetted, even by the sea-spray, and were of a blue-grey colour; many of them were plentifully spotted with a minute lichen, which I have been referred to as *Lecanora aspersa*, and also as *Lecidea petræa*, the

latter most probably being the correct name. Wherever a trio of eggs had been located amongst these the similitude was remarkable. I took a stone or two home with me, and, placing egg and stones together, made a coloured sketch of them, "just for the novelty" of it. These lichen-spotted stones do not occur at Yarmouth, where all the shingle-strips are subject to the laving of the sea-waves, but at Aldborough, on the Suffolk coast, under conditions like those obtained at Wells, I found long stretches of them exactly corresponding in appearance.

We presently hid in the long marram-grass on the higher sand-heaps, when the Terns with no more ado simply flew above their nests, and from an elevation of ten or twenty feet alighted right down upon them, their wings closing as their light buoyant bodies touched their precious eggs. The wind was easterly, and nearly all their previously agitated manœuvres had been performed head to it; and they, without exception, sat upon their eggs with the bill pointing eastward. The clamour ceased at once. Just prior to our sitting down on the sand-dune we flushed a Red-legged Partridge from its nest, the startled bird dashing across the nesting area, whereupon the angry Terns darted down at it, and fairly mobbed it out of sight.

I regret that my time was so limited, for the nesting habits of the Terns are exceedingly interesting; and Tom Cringle himself, a characteristic son of the marshes, was "no chick" at bird-lore, or uninteresting in his conversation. A mighty hunter of wild-fowl he may be in the winter months, but a famous and reliable watcher he appears to be in his proper season; and I question whether any of the "egg-poaching" fraternity would profit by trying any of their games upon him. That the very splendid protection given the Terns at nesting-time is rewarded by good results seems to be an assured fact, and one only regrets that on their passage south in the autumn they should be treated with scant kindliness by irresponsible and reprehensible gunners. It is gratifying, too, that at Cley and Blakeney, equally famous nesting places, similar protection is afforded them; and the report issued by this Society is so entertaining, that I am constrained to copy a few lines from the watcher's report for 1904:—

"*June* 22*nd*.—Found Lesser and Common Terns' and Dotterells' [Ringed Plovers'] nests with eggs.

"*May* 28*th to end of month.*—Plenty of fresh nests.

"*June* 12*th.*—First clutch of Lesser Terns and Dottrells hatched out.

"*June* 13*th and* 14*th.*—First lot of Common Terns hatched; strong healthy birds."

The last line of R. Pinchin's report is most satisfactory:—"I am sure there are more Tern, Sheldrake, &c., come every year."

Such efforts to preserve some of our most beautiful British birds are praiseworthy, and the results truly gratifying, and should not be hampered in any way by lack of funds. Messrs. Q. E. Gurney, of Northrepps Hall, and C. A. Hamond, of Twyford Hall, are the Hon. Secretaries of these useful societies.

NOTES AND QUERIES.

AVES.

The Hawfinch in Epping Forest.—On May 14th we found a dead male Hawfinch (*Coccothraustes vulgaris*) in the Bury Wood, near Chingford. It appeared to have been killed by some sort of missile only a few hours previously, the clot of blood upon the wound being quite fresh. We took the specimen home, and had it stuffed and mounted. Mr. Howard Saunders ('Illustrated Manual of British Birds') describes the bill of the adult male Hawfinch in summer as "dull black at tip, leaden blue at base." This description applies to our specimen when the bill is viewed from above or from the side, but the under surface of the mandible is, to quote Mr. Howard Saunders again, "pale horn-colour," the colour noted for the bill in both sexes in winter. We should add that prior to the finding of our bird we had already observed the Hawfinch in the forest upon a few occasions.—F. W. & H. Campion (38, Maude Terrace, Walthamstow).

Albinic Form of Starling.—I have an immature specimen of *Sturnus vulgaris* in my possession, which was shot at Leeswood, Flintshire, on the 2nd ult. It is absolutely cream-white in colour, and I thought it worthy of record. Judging from the condition of its plumage, &c., it could not have left the nest more than a day or so.—A. Newstead (Grosvenor Museum, Chester).

Notes on the Tawny Owl (Syrnium aluco).—Last April a pair of Tawny Owls nested in one of the holes in our church-tower, and laid three eggs. One of these was infertile, having apparently been damaged by the claws of the sitting bird, but the other two were hatched. On one occasion I found a half-eaten Rat in the nest, and on another visit I found three Rats (all half-consumed), and a Field-Mouse. Two at least of these Rats were old ones, and I believe that the superior size and weight of the Tawny Owl enables him to kill these vermin when a White Owl could not do so. Much to my regret I found the cock bird huddled up in a corner of the belfry one day, and found he had been dead some time. The misfortunes of the family did not end here, as about a week after one of the owlets was lying

dead on the gravel-walk under the hole, and the other had entirely disappeared. Four days later it was found by a woman, who took it home and kept it nearly a week. Whether it fluttered down from the nest, or whether it was removed by the surviving parent to one of the trees near, I cannot say, but it must have been fed by her. Having acquired it, I returned it to the tower, where I fed it daily for a time, but, as it never seemed to be very hungry, the mother had evidently found it, and it eventually took its departure. The corpse of the other unlucky fledgling was devoured with much satisfaction by a young Tawny Owl we have here, which is a very tame and a most amusing bird. As is the case with all carnivorous pets, his food supply is rather a difficult matter, and the lives of sundry young Starlings and Thrushes have been sacrificed to meet his requirements. He will, however, eat raw meat and liver, or even cooked meat, if disguised with a few feathers. Some of his actions are very like those of a Parrot, especially when he is doubtful about the edible qualities of a piece of food, and holds it up with one foot with two toes turned back. He does not in the least mind being fed by candle-light, which does not appear to be at all trying to his marvellously beautiful eyes.—Julian G. Tuck (Tostock Rectory, Bury St. Edmunds).

The Sounds produced by the Long-eared Owl (Asio otus). — Your correspondents (*ante*, pp. 183 and 233–36) do not take notice of a sound which resembles the quick striking together of the teeth of the lower jaw against the back of those of the upper jaw—snap, snap, snap, &c. —so. Years ago, when, having found a Long-eared Owl's nest, sometimes with eggs only, but often with both eggs and young, I have brought the old birds both "close up" by thus snapping my jaws together. Sometimes one or the other parent brought food to the young, but often both came without. I called them up, much as I have also brought Woodpeckers. At migration time—*i. e.* in the far north—the Owls are more easily brought up, by imitating the cheep of some small rodent.—J. A. Harvie-Brown (Dunipace, Larbert, Stirlingshire, N.B.).

After reading Mr. Warren's note in the June 'Zoologist,' on "The Sounds produced by the Long-eared Owl," I must correct the suggestion I made in the same number, that the "oo, oo," described on his authority in the 'Birds of Ireland,' might be the call of the female rather than of the male Long-eared Owl. Mr. Warren's full description makes it quite clear that he means the monosyllabic cry of the male—the note which I syllable as "oop"—and not the more or less dissyllabic "shoo-oogh" of the female. But I think Mr. Warren's

communication and my own point to exactly the same conclusion as regards Mr. Gyngell's "Sound No. 1," *i. e.* that the latter is the cry of the female. When I call this cry "more or less dissyllabic," I mean that it is slurred downwards and very prolonged; there is no dividing line between first and second syllables as in the cry of the Cuckoo, but only a gradual transition as in the challenge-crow of the Partridge.—C. B. MOFFAT (36, Hardwicke Street, Dublin).

I HOPE the observations on the noises made by the Long-eared Owl will continue and extend to the other species of Owl also. In Northumberland nearly every plantation has its pair of Long-eared Owls, and large woods many pairs. I have visited scores of nests with eggs and young, and have kept several as pets. The noises I have heard them make are—(i) A short expiratory "hagh," which one can easily imitate by forcing air rapidly from the chest with the mouth wide open. Young in the down and grown birds do this when approached. (ii) "Snapping the beak," a sharp sound made, I think, by suddenly opening the beak when the pressure inside is reduced by suction. (iii) A silvery chirruping, which can be imitated by shaking a bag of small silver coins for about three seconds at a time. When one of my tame Owls flew to a perch where the other was sitting, the sitting one nearly always greeted it with this noise. I have heard it in the woods at dusk just when they are beginning to move about. These three sounds are the only ones my tame Long-eared Owls ever made. The night noises of wild ones I have never been able to discriminate from those of the Tawny, which in Northumberland nearly always inhabits the same woods. I know the long sad moan and "shoaghing" described in the June 'Zoologist,' but I believe the Tawny sometimes imitates the former. I am glad to be able to put them down to the Long-eared on your correspondent's authority. I have never known a Long-eared make any noise at all when disturbed in the daytime either from its nest or roosting-place, and I must have disturbed them hundreds of times. On the few occasions on which I have seen them on the move at night (when I had no doubt as to the species) they have moved silently from perch to perch in short flights, and I have always thought them to be quiet birds. The Tawny, on the other hand, is a noisy creature, frequently "hooting" (a term including a great variety of noises), and uttering its loud "kee-yak." My captive Tawnies also made a similar "hagh" and snap of the beak to those of the Long-eared, but they never hooted, and seldom made the loud "kee-yak." Once I watched three young Tawny Owls sitting on a dead branch of a beech tree in the moonlight, and whenever the old ones brought them

anything they all set up a lively chirruping. I have never heard the Long-eared make the No. 3 sound Mr. Gyngell describes in the May 'Zoologist,' but one day I visited a Tawny's nest, with newly-fledged young, in a spruce-fir, and the old bird, when disturbed from the nest, flew from tree to tree close by, and every now and then brought its wings together beneath it with a loud "bock." I followed her about until satisfied as to how she did it. On another occasion (a bright sunny day) I came across a Tawny sitting in a small spruce-fir eating a Starling. When disturbed it behaved as I have never before or since seen one. It flew from top to top of the large spruce-firs, every now and then bringing its wings together with a "bock," and then uttering a loud prolonged laughing cry, like that of a Peregrine when one is near its nest. A Barn-Owl I kept used to snap its beak, and I have heard wild birds utter their ghastly shriek, a loud "kee-yak," like that of the Tawny, and the peculiar snoring noise of the young (and old ?) in the nest, and when sitting about in the trees after having left it. With our very defective night vision it is seldom one has a chance of fixing the author of any strange sound one hears. I long attributed the abrupt "chuck" of the Nightjar to the Long-eared Owl, until one night a Nightjar sat a few feet off me on a light dusty road making this noise. I therefore hope many of your correspondents will give us instruction on our lovely and interesting night-birds by recording the opportunities they have had of discriminating between their numerous and varied notes.—C. H. Bryant (76, Grand Parade, Brighton).

Montagu's Harrier at Rainworth in June.—A keeper near here, having lost several young Pheasants, put it down to a Sparrow-Hawk, and on June 14th, in the dusk of the evening, seeing a Hawk, shot it; he brought it to me on the 15th, when I saw it was a male Montagu's Harrier (*Circus cineraceus*). I was indeed sorry, because one would suppose it was one of a pair, and most likely breeding in the forest, a large extent of which is heather and white grass, and is just such a place we should expect to find this species nesting, though so far I have never known it to do so. This is only the third specimen of this Hawk I have known to have occurred in Notts, and, curiously enough, all have been obtained near where this one was shot.—J. Whitaker (Rainworth Lodge, Notts).

Nesting of the Merlin in Breconshire.—Two nests of *Falco æsalon* have been found this spring by a gamekeeper on the Nant-ddhu Grouse moor, about twelve miles south-west from Brecon, and about twelve hundred feet above sea-level. One was found on May 15th, and another on May 25th. The first contained three fresh eggs, and the

second four. They were on the ground surrounded by heather. I have in my possession eggs from both of these clutches. They are a good deal smaller than Kestrel's, and at a distance appear to be of a uniform reddish mahogany colour, but on close inspection are found to be covered with minute brick-red and black specks, and most of them have a slight purple tinge. On May 29th, 1888, a Merlin's nest containing four eggs was found by my friend Mr. Edgar Thomas on the same moor. He happened to be walking across a heather-clad hillside, and flushed the sitting bird from the nest. This set of eggs were placed in a Brecon collection, and are very like those above described. Meadow-Pipits, as well as Grouse, are very abundant on this moor, and Merlins are more numerous here than in most parts of South Wales, attracted probably by the food supply afforded by one or both of these species. The gamekeepers think that these little Hawks destroy the young Grouse.—E. A. Swainson (Woodside, Brecon).

Nesting of the Merlin in Derbyshire.—The Merlin is now so rare a bird in North Derbyshire that some account of its nesting here during the present season may be of interest. On May 29th I visited a nest of this species. It was situated about eight and half miles N.N.E. of Bakewell, on a wild and unfrequented piece of moorland, and among rank heather on the slope of a hill. It contained five eggs, quite fresh, and much darker in colour than those figured in Seebohm's books. The two old birds had been shot a few days before, but they had left ample traces of their presence, for within a considerable radius of the nest were the spots where their prey had been devoured. The remains showed that Meadow-Pipits had been the most common form of food, but a Greenfinch and two young Grouse had afforded some variety. Many pellets were also found, but these have not been examined. On June 28th another nest was found six miles N.E. of Bakewell, and three miles from that above mentioned. It contained five young Merlins in down, with the wing-quills just beginning to sprout. The old birds were killed, the hen being trapped, and the cock being shot. I have not yet had an opportunity of seeing the nest and its surroundings, but there is no doubt that the young Grouse will have paid heavy toll to the growing Falcons.—W. Storrs Fox.

Night-Heron, Black-headed Bunting, and Great Sedge-Warbler in Sussex.—On Sept. 24th, 1904, an immature female of the Night-Heron (*Nycticorax griseus*) was shot at Pevensey, Sussex. On April 21st, 1905, a very fine cock Black-headed Bunting (*Emberiza melanocephala*) was killed at Little Common, Sussex, in full adult yellow

plumage. On May 1st, 1905, a fine male Great Reed-Warbler (*Acrocephalus turdoides*) was killed at Bexhill, Sussex. The above were all brought to Mr. Bristow, of St. Leonards-on-Sea, to be set up, and are now in my collection.—J. B. Nichols (Parliament Mansions, Westminster).

Hybrid Pochard in Norfolk.—Last year I received, from the Rev. B. Upcher, a Duck, supposed to be a female hybrid of some sort, which had been caught on Saham Mere, an attractive piece of water in Norfolk to wildfowl. The Duck was shy and in very obscure plumage, but has now grown tame, and will come to the edge of the pond for bread, which has facilitated its comparison with sundry Pochards and Tufted Ducks, alive and dead. It is evidently a female, for its plumage has altered but little, and that it is a cross between these two species seems very probable. The chin and throat are quite dark, the belly nearly white; there are perceptible vermiculations on the back, and it has a not very distinct bar of white on the wing. The eye is dark brown, and the beak in size and shape intermediate between the Pochard and Tufted Duck. Its under tail-coverts are white, and this is the only point in which it does not quite agree with either of the above species, but better with the Nyroca Duck, of which it should be mentioned a hybrid was caught on Saham Mere some years ago (Zool. 1898, p. 108). J. H. Gurney (Keswick, Norfolk).

On the Nesting of the Rock-Dove (?) in a Rabbits' Hole at Nevay Park, Forfarshire.—Towards the end of April (1905), whilst inspecting the enclosure of broken ground on a steep slope on Nevay Hill, for the planting of blackthorns and cotoneasters, a Dog steadily pointed at what was understood to be an empty Rabbits' hole (for they had all been cleared out preparatory to the enclosure). On examination the keeper found a pair of young Pigeons with feathers partially developed. The hole occurred on the upper edge of the broken ground, and an aperture existed on the top as well as that beneath the ledge, the latter apparently being most in use. The birds had evidently been hatched where they were found, *viz.* about a foot within the aperture at the edge of the ledge, where they were perfectly secure from observation. Moreover, the slope is nearly a mile from a habitation, and in a very quiet region. The keeper thought they might be the young of Cushats frightened from the larch woods by boys, but this was unlikely, though Mr. R. M. Craig, a young naturalist at present at the Gatty Marine Laboratory, has found the nest of the Cushat within reach of the hand on low spruces in Glenfinnart, Argyllshire. A few days before a swift-flying Pigeon, like a Rock-Dove, had been seen on the

hill, and a few days afterwards a pair were noticed at a considerable distance from the spot, near which only Cushats had been seen. Meanwhile the birds were left in their hole, in the hope that the developing feathers would soon establish their specific identity. Unfortunately before a week elapsed they had disappeared. Since the foregoing date, however, a pair of Rock-Pigeons were again seen (June 24th) near Rabbits' holes in a different part of the hill. The nesting of the Rock-Dove in Rabbits' holes seems to be rare, though their habits in the caves of the Outer Hebrides would seem to show considerable power of adaptation to circumstances. It is known that other land-birds, such as Jackdaws, make use of Rabbits' holes for nesting. Thus Jackdaws not only do so on the cliffs at Craighall, Perthshire, but have been observed to seize the very young and frolicsome Rabbits and drop them over the precipice. The privacy of the slope at Nevay, and the absence of rocky ledges, probably led the birds to select such a site, just as in former years the quietude of a country house at Murthly enticed the Kestrels to make their nest and rear their young in a box (which the Swifts usually regarded as their own) originally placed under the eaves for Starlings.*—W. C. McIntosh (The University, St. Andrews).

Effects of Rural Depopulation on Wild Life.—For the last year or two I have been taking rambles about the country-side, which men are abandoning more and more every day for overcrowded towns. I am struck with the great change this rural depopulation is making on the fauna of country districts. I have been making out lists of observed species in the locality where I happened to be from my boyhood upwards, and it is most interesting to me to compare these old lists with those I am daily adding to now. As I was saying, I am noticing decided changes. Not only is wild life more plentiful, but it is now really wild life, and not so much of that semi-domesticated type which is seen in the avian hangers-on to human society who love to haunt rural gardens, farmyards, corn-fields, and village lanes. In this connection I would like to say something about the reprehensible manner of making up local faunas and lists of species by lumping together all records of occurrences within half a century and more. The value of these local faunas would, in my opinion, be greatly increased were a comparison made between lists of thirty years ago and such as can be made out at the present time. This is especially true in these days when rural depopulation and land going out of cultivation by the thousand acres is making a comparison between the past and present

* 'Scottish Naturalist,' vol. iv. p. 46 (1877).

faunas of a particular locality very valuable. — Albert H. Waters (Cambridge).

PISCES.

What is the Heaviest Weight reached by the Rudd (Leuciscus erythropthalmus)?—The fish referred to by Mr. Green (*ante*, p. 256) is an undoubted Rudd, as its captor sent me a photograph of it in a case as set up by the taxidermist. In order that no doubt should appertain to its identity, I showed the photograph to Mr. Boulenger, who confirmed the identification. The weight of this fish (4 lb. 4 oz.) given by Mr. Green is so unusual that I wrote to that gentleman for exact measurements, and he kindly took off the back of the case and sent me following dimensions :—

I then sought the experience of Mr. R. B. Marston, the well-known editor of the 'Fishing Gazette,' as to the record weight of this fish, and the following reply was kindly sent me :—"The largest Rudd, recorded by Dr. Day in his 'British Fishes,' was taken by my late friend Dr. Norman in Norfolk, and weighed 3 lb. 1 oz. I may have recorded larger ones, but do not remember them. There is a Roach of nearly 4 lb. at the present Earl's Court Exhibition, as well as many large Rudd, but none quite 3 lb., I think." I have also written to our contributor, Mr. A. Patterson, who possesses such a wide knowledge of Norfolk fishes, but he could only inform me that this fish does not often exceed two pounds in weight, and his greatest weight record is the one taken by the late Dr. Norman, to which Mr. Marston has already referred. Consequently this record of Mr. Green is a very unusual one.—W. L. Distant.

THE ZOOLOGICAL SOCIETY'S GARDENS.

In the month of June two acquisitions, one to the collection of Mammals, the other to that of Birds, overshadow the rest in importance. The mammal is a young female Orang-outan from Deli, Sumatra, presented by Dr. Graham. She is a perfectly docile and healthy animal, and, coming with a good appetite and at a favourable time of the year, will form a test case for the suitability of the Apes' House for members of this genus of Anthropoids. So far as can be judged from up-to-date results, Chimpanzees do well here; but it by no means follows that conditions that suit Apes of the latter kind are also suitable for Orang-outans. In view of what is known of their mode of life it seems probable that a house built on the principle of a well-ventilated conservatory, with a large tank of evaporating water, would be more in keeping with their natural habitat, namely, trees overhanging forest swamps, than the relatively dry cages in which the Chimpanzees live and thrive. From Mr. Rothschild the Society has received on deposit a second example of that rare and handsome species of Monkey, Wolf's Guenon (*Cercopithecus wolfi*), which is allied to the Mona and Campbell's Guenon; also a specimen of a species not represented in the collection for many years, the Pluto Guenon (*C. leucampyx*).

For a long time we have been on the look-out for a male Painted Ocelot. At length, through the kindness of the Right Hon. Charles Booth, we have received one from Cis-andean Peru, procured by H. E. Signor Fuentes. The four examples now in the collection admirably illustrate the great and as yet unintelligible colour variations presented by this species of South American Tiger-Cat.

Wild stock of domestic breeds have an interest all their own. Hence it is satisfactory to record the donation of a specimen, albeit young, of the Grecian Ibex (*Capra ægagrus*), from Antimilo, one of the Cyclades, where this species, the progenitor of domestic Goats, still survives. To a question as to the possibility of this specimen being half-bred from wild and tame stock, Major Finnie, the donor, replied that, so far as his observations go, the wild Goats avoid and do not mingle with the domestic herds.

Another interesting ruminant is a female specimen of the daintiest and most beautifully marked of all Antelopes, the Harnessed Bushbuck (*Trapelaphus scriptus*), from West Africa.

The last addition to the Mammalia to be noticed is a pair of Orkney Voles (*Microtis orcadensis*), presented by Mr. Headen Cocks. This

very interesting species was described, it will be remembered, in 'The Zoologist' for last year by Mr. J. G. Millais. With the exception of the Skomer Bank Vole, all the known species of English Voles are now represented in the Zoological Gardens.

The important addition to the collection of Birds, mentioned above, is a series of eleven Kiwis, representing the North Island race of the original species, namely, *Apteryx australis mantelli*, or Mantell's Kiwi. The Society has to thank Lord Ranfurly, the Government of New Zealand, and Mr. H. C. Wilkie, F.Z.S., for the donation, and the latter also for his great care of the birds upon the long voyage home. It is certain that no such series of Kiwis has ever previously been exhibited in any European menagerie. Antipodean birds usually do well in England. Hence it is to be hoped that this morphologically isolated type will be for many years represented in the Gardens.

It is not often that that remarkable arachnid *Galeodes* is seen alive in England. In the Insect House, however, there is now a female of the Soudanese and Egyptian species, *Galeodes lucasii*, presented by Mr. W. G. Percival. In Egypt this animal is commonly known as the Tarantula, from its ferocious and spider-like aspect, and both in that country, in India, and South Africa fights between *Galeodes* and Scorpions are a common pastime of soldiers.

R. I. P.

OBITUARY.

William Thomas Blanford.

Zoologists and geologists will feel an absolutely personal regret at the loss of Dr. Blanford, who passed away on June 23rd, in his seventy-third year, at Bedford Gardens, Campden Hill.

He was born on Oct. 7th, 1832, at 27, Bouverie Street, Whitefriars, in the city of London, the house and manufactory adjoining it belonging to his father, William Blanford, and which premises now form part of the printing and publishing offices of the 'Daily News.' Educated privately at Brighton, he was sent to Paris at the age of fourteen, where he remained till March, 1848, and then passed two years with a mercantile house at Civita Vecchia, the head of that firm being an old friend of his father's. Returning to England in 1851 he joined his father's business, but soon detected his true vocation, and entered the Laboratory of the Royal School of Mines under Lyon Playfair in 1852, and matriculated in the autumn of that year. After leaving the School of

Mines in 1854, he passed a year at Freiberg in Saxony, in the study of chemistry, mineralogy, mining, and metallurgy. It was in this year that he and his brother were offered and accepted posts on the Geological Survey of India, and it is from this date that an active scientific career commenced which was only terminated by death.

Dr. Blanford was one of those few men who are really scholars in the domain of their subject. His first published paper, in 1854, was "On a Section lately exposed in some Excavations at the West India Docks"; his almost last was in 1901, on "The Distribution of Vertebrate Animals in India, Ceylon, and Burma," printed in the Trans. Roy. Soc. He was attached as geologist and zoologist to the Abyssinian Expedition in 1867, which resulted in the publication of a well-known and valued volume; while subsequently another volume on the 'Zoology and Geology of Persia' was the outcome of his journey with another expedition. As a result of his labours in the Geological Survey, he had traversed, in the course of nine years, the whole peninsula on foot or on horseback, with the exception of some twenty or thirty miles, from the Arabian Sea near Surat to the Bay of Bengal at Coconada.

His zoological work, however, is focused in the volumes devoted to the 'Fauna of British India,' of which the vertebrates have been described and the invertebrates commenced. Some of these volumes he wrote, and all published to date he edited, and it seems only the other day, though the date was 1881, that at his request we supplied him with some statistics relating to the then scanty knowledge of the Indian Insecta, which he included in a paper "On our Present Knowledge of the Fauna inhabiting British India and its Dependencies," read before a meeting of the British Association. To have inaugurated and so long edited with conspicuous ability this well-known series of volumes is to have engraved his name in faunistic zoology. He was a good and conscientious editor, as those who served under him will admit; always courteous, he was yet constant to his own opinion, and when any divergence of view arose he was generally found in the sequel to be in the right, and if in a very few instances the contrary was the case, he was the first to acknowledge it. It is unnecessary to refer to the high posts he from time to time held in our scientific societies; suffice it to say he died in harness, after living a worthy and strenuous life in advancing the study of natural science, and died really regretted by his friends, and respected in all scientific circles.

Col. L. Howard Irby.

It is with sincere regret for the loss of an old and valued friend and a thoroughly good and trustworthy ornithologist that I venture to send the accompanying notice to 'The Zoologist' of the death, on the 14th May last, of Col. Leonard Howard Irby, F.Z.S., F.L.S., &c.

I first met him at Gibraltar in 1870, when he was still in the service as a Major in the 74th Highlanders, and engaged in writing his well-known 'Ornithology of the Straits of Gibraltar." From that time until the date of his death I saw a great deal of him, and was connected with him in various shootings, and in expeditions to all parts of the British Islands in search of materials for the series of bird groups at the Natural History Museum at South Kensington; also of British Lepidoptera for our own private collections. His knowledge of birds was wonderful, while his quick sight and accurate shooting lasted until the end. No one more thoroughly enjoyed a ramble over hill and dale, and a good bird-hunt, than he did. Moreover, he did not confine his energies to birds alone, but was a keen lepidopterist, and devoted to the study of wild flowers.

Born in 1836, Col. Irby was educated at Rugby School and at Wimbledon; he joined the 90th Light Infantry as ensign in 1854, and at once proceeded to the Crimea, where he served until the end of the war, including the siege of Sebastopol. During this period he managed to collect, and write notes upon, Crimean birds, which soon attracted attention; so that his further notes on the birds of Oudh, written while serving in the Indian Mutiny campaign, were gladly welcomed by the leading ornithologists of the day. It is interesting to record that he and Lord Wolseley, both in the 90th Light Infantry, together fought their way, with their respective companies, into Lucknow at the time of the memorable relief of that city. In 1864 Col. Irby was transferred to the 74th Highlanders, in which regiment he served until his retirement from the army, which took place, I think, in 1872.

The ornithological works by which he will best be remembered, and the accuracy of his knowledge of birds be appreciated, are the 'Ornithology of the Straits of Gibraltar,' first published in 1875, with a second and enlarged edition in 1895, and his 'Key-List of British Birds,' published in 1888. These may, I think, be looked upon as two important standard and classical works on birds, and are probably to be found on the bookshelves of every ornithologist of the present day. His other minor papers, including one in 'The Ibis' on the "Birds of Santander," are perhaps not so well known; but all are most interesting and carefully written.

Spain was his favourite hunting-ground, and there, in company with his genial and firm friend, Lord Lilford, he spent many of the pleasantest days of his life. Both of them were excellent Spanish linguists, both loved the sunny hills and woods of the peninsula, and thoroughly appreciated the attractive qualities of the natives. It was in Andalusia, of course, as well as on the opposite coasts of Morocco, that the materials for the 'Birds of the Straits' were so ably collected, and it was to Spain that poor Col. Irby's last expedition was made, when, ill and unable to endure the climate of England, he went out to Malaga for the past winter. Here he took up his quarters for some months on the shores of the Mediterranean, but unfortunately the weather even in this favoured region proved inclement, and by no means beneficial to him, and he returned home only to die shortly afterwards of heart-failure at 14, Cornwall Terrace, Regent's Park. He was buried at Kensal Green Cemetery, followed to the grave by many sorrowful old friends. His residence in Cornwall Terrace commenced in December, 1889; it was a most suitable position for him, as it was close to the Zoological Gardens, the Botanical Gardens, and Lord's Cricket Ground, of all of which institutions he was a member. He served often and ably on the council of the Zoological Society, and was keenly interested in all matters pertaining to the animals and their management. He was also a frequent visitor to Lord's, and enjoyed seeing good cricket as much as anyone. Many a good match have I watched from the pavilion in his company, and I had hoped to sit there alongside him again this summer. But this is not to be, and so I will conclude with the expression of the hope that these hastily written lines may prove of interest to his many ornithological friends.

S. G. R.

Yalding, Kent.

EDITORIAL GLEANINGS.

Biologia Centrali-Americana.—We have to thank Mr. Champion for the following statistics relating to this great biological publication:—

Progress of the zoological portion of the work up to March, 1905 (including parts 1–187).

Forty volumes completed, twenty-nine of which are devoted to Insecta.

The number of species already enumerated or described, and the subjects still awaiting treatment, are as follows:—

Subjects treated.	Total Number of Species.	New Species described.	Subjects not yet treated.
Mammalia	177	—	Pisces.
Aves (4 vols.)	1413	14	
Reptilia and Batrachia	695	63	Crustacea.
Terrestrial and Fluviatile Mollusca	887	82	Coleoptera (certain families of Rhynchophora).
Araneidea and Opiliones (2 vols.)	1181	837	
Scorpiones, Pedipalpi, and Solifugæ	69	8	
Acaridea	47	43	Hymenoptera Aculeata.
Chilopoda and Diplopoda*	71	32	
Coleoptera (16 vols.; † all finished except Rhynchophora)	15,293	9659	Micro-Lepidoptera.
Hymenoptera (3 vols.)	2202	1053	
Lepidoptera (6 vols.)	5444	1672	Neuroptera (other than Ephemeridæ and Odonata).
Diptera (3 vols.)	2320	993	
Rhynchota Heteroptera (2 vols.)	1700	870	
,, Homoptera (2 vols.)‡	1168	616	
Orthoptera (2 vols.)‡	877	310	
Neuroptera*	152	44	
	33,696	16,296	
Totals for Insecta alone	29,156	15,217	

* In course of publication.

† Thirteen volumes completed, three in course of publication.

‡ Vol. ii. in course of publication.

"*Plague of Pike.*—According to Mr. T. C. Daniel, president of the Exe Board of Conservators, Pike are playing great havoc among the Trout in the Exe at Tiverton. The Watch Committee are to consider the best means of ridding the river of the pest."—*Daily Chronicle, May 15th.*

The famous snake-catcher of the New Forest, "Brusher" Mills, has been found dead at Brockenhurst. Of unkempt and decrepit appearance, the old man had for many years lived a hermit's life in a secluded part of the forest near the King's hunting-ground, and was in many ways a quaint character. Venturesome tourists sometimes came across Mills while he was out "hunting." With much dexterity he would pick up the snakes between his fingers and transfer them to the large tin can which he carried fastened to his waist. It is calculated that Mills caught between five and six thousand snakes during his many years' residence in the forest. These he disposed of to the "Zoo" authorities as food for the larger reptiles. Shortly before his death Mills visited the railway hotel at Brockenhurst, and afterwards his lifeless body was found in an outhouse.

We have received the "Fourth Report of the Government Entomologist" (Mr. Claude Fuller), published by the Department of Agriculture of Natal. In addition to insect-pests, we find the following complaint as to the arrival of *Passer domesticus* in the "Garden Colony":—

"The presence of this pestiferous bird in Durban, and the certain indications of its increase since April, 1902, when Mr. J. D. S. Woodward called attention to it, are sufficient reasons for introducing some notice of the bird into this report. Apart from that, since I have become acquainted with its establishment at the port, I have considered it my bounden duty to urge its extermination upon all and sundry. The Sparrow is receiving the same apathetic attention here that it has received elsewhere, whilst it is establishing itself in a new field and under fresh conditions and circumstances.

"The circumstances of its introduction are similar to other cases, and can only be described as 'the mistaken enthusiasm for things English.' I gather that a few birds were imported by a gentleman in Durban some six years ago. These he kept in captivity for some time, and then, because their chattering was such a nuisance, they were turned at large.

"The situation at present is this: the English Sparrow, which must be classed amongst the worst of vermin, is now established in Durban, but so far does not extend to the rest of British South Africa. Nothing to control its increase and spread is being done, and the question is whether we in Natal are to sit idle and allow the pest not only to become a nuisance to ourselves, but a menace to the rest of the colonies.

"I know there are arguments against the extermination and destruction of Sparrows. They are all the same, and have been used over and over again, but they are mere platitudes of senseless and ignorant or unobservant people. The case for and against the bird has been fought out again and again. It has been argued before Select Committees of the House of Commons, and before those of colonial legislatures. It has been argued by many scientific men in many lands, and in every case the weight of evidence has been against the Sparrow, and the verdicts such as to warrant this colony in taking every measure to suppress the birds altogether, at once and at any cost."

There is always a romance attached to the obituary of the last representative animal in a local fauna, and this applies to the last wild Red Deer in Co. Donegal. This story, as told by Mr. W. F. de Vismes Kane, has been recently communicated by Mr. R. Welch to our excellent contemporary 'The Irish Naturalist,' and we venture to reproduce it as it appeared, for it would lose by abstract or condensation:—

"It must have been about the year 1862 that I was Salmon-fishing in the Lackagh, and Mr. Stewart's (of Ards) water-keeper, Edward Gallagher (if I do not mistake a name that was once familiar to me) attended me. The Salmon were then more keen at taking the fly than they became afterwards, and he was a sure hand with the gaff. He had a very old bedridden father—he might have been ninety years old from his looks—who told many stories about that part of the country. He said *his* father, a very old man, told him that when he first came to those parts the country was very sparsely inhabited, and to see any of his neighbours he had to travel over the hills and bogs seven to ten miles. The Lackagh was then so full of Salmon that it was easy to gaff as many as one wanted in the season, and the rocky banks ('*Lack*'agh) were full of wild cats, who fed on the fish killed by the Otters, and left with only a bite or two taken out of them. Also that there were still plenty of Deer in the mountains still surviving, and that very occasionally word was sent round that part of

Donegal to appoint a day and have an organized hunt. Certain passes were known and appointed, toward which the whole available beaters drove the Deer, and a palisade on each side was repaired, which narrowed little by little as it approached a bog. Here right across the mouth of the palisaded route was dug a very deep trench in the bog, at the bottom of which were upright sharp stakes, and all this was lightly covered with heather. This story carries one back, I should say, to the beginning of the eighteenth century.

"The manner in which the last Deer was killed is as follows, and happened quite in the old man's lifetime, if I recollect aright:—There was a single surviving Stag frequenting Glenveigh. Many times he was hunted, but never could be shot. It was observed that whenever the chase took a certain direction he evaded his pursuers, and those lying in wait, by making for a path which crossed the precipitous face of a mountain (probably one of those on the far side of the lake from the present castle). This path at one place was broken off, and the Stag jumped the gap, and followed the track on the other side. On one occasion an old woman, hearing the shouting, concluded that the quarry was once again trying this method of escape. She was on the far side of the gap, and so, taking off her red petticoat, she placed it on the stone on the edge where the Deer would alight when he took his usual leap. The animal, coming to the off-take, swerved in his jump to avoid the unwonted and surprising coloured garment. He slipped on alighting, and could not retrieve his footing, but fell down and was killed."

In the 'Newcastle Daily Journal' for July 8th there appeared a communication respecting the occurrence of the Rustic Bunting in the North of England. Mr. Thomas Thompson, of Winlaton, writes as follows:—

"It is over six months ago since I mentioned to you that I hoped to have something to say respecting a 'Rustic Bunting' (*Emberiza rustica*). Mr. I. R. Slack, a neighbour of mine, had it exhibited at the Crystal Palace cage-bird show in January last, where 'Mr. Walter Swaysland was one of the judges, and he pronounced it most emphatically to be not a Rustic Bunting.' The words I have just quoted are taken from the 'Feathered World,' a newspaper published in London. This bird has been in Mr. Slack's possession since 1903, and was caught near Seaton Sluice, Northumberland. I compared the specimen with a skin I obtained from London a few weeks ago, and it agreed with the latter closely. I may also state that Canon H. B.

Tristram, of Durham, saw Mr. Slack's bird, and said no doubt it is a hen Rustic Bunting. Very few specimens of this species have been seen in England, and its name does not appear in Mr. Hancock's Catalogue of the Birds of Northumberland and Durham.'"

Mr. J. Travis Jenkins, writing in the July issue of 'Knowledge and Scientific News' on the subject of the migration of flat-fish, states:—

"The majority of scientific experts agree that round fish, *i. e.* fish of the Herring and Cod type, perform migratory movements of considerable magnitude, but as regards flat-fish, *i. e.* Plaice, Soles, and Flounders, the consensus of opinion is by no means so unanimous.

"The International Committee for Investigation of the Seas, which has quite recently been established, has taken up, among other problems, the question of the migration of members of the flat-fish family, or *Pleuronectidæ*. This international committee consists of scientific experts nominated by the Governments of England, Norway, Sweden, Germany, and Holland, and is subsidized by grants from the respective Governments. Batches of marked Pleuronectids, chiefly Plaice, have been marked from time to time, and then liberated at various points in the North Sea. The mark used consists of a silver wire, which is threaded through the body of the fish. To this wire are attached on the under side a bone button, and on the upper side a numbered brass label. Each fish is carefully measured and labelled, the whole operation from the time the fish is removed from the tank to the time it is replaced taking less than one minute. It is hoped that by these experiments the amount and nature of the migration of flat-fish will be determined, and attempts will be made to show the influence of the environment on migration. The intensity of fishing in any given area can be determined by the proportion of fish recaptured to the total number of marked fish returned to the sea. Since each marked fish is carefully measured both when it is returned to the sea and when recaptured, the rate of growth can also be determined. Plaice seem to withstand the marking operation wonderfully well, but Soles are far more difficult to deal with successfully. No doubt other results will be arrived at, notably the efficacy of closed grounds in maintaining a reserve of fish, and the effect of the density of fish population on the rate of growth."